

What is claimed is:

1. An apparatus for determining a total concentration of a component in a sample, comprising:
  - a reactor for oxidizing or reducing the sample;
  - a chromatographic column coupled to said reactor for separating the component in the sample; and
  - an electrochemical gas sensor coupled to said chromatographic column for detecting the component.
2. The apparatus according to claim 1, wherein said electrochemical gas sensor further includes
  - a substrate having a surface for depositing electrodes thereon;
  - an ionomer membrane in contact with said surface of said substrate and having a first surface and a second surface;
  - an electrode in contact with said surface of said substrate;
  - an opening extending from said first surface to said second surface in a location proximate to said electrode for defining a passage; and
  - a gas in said opening and simultaneously contacting said electrode and said ionomer membrane for providing a three way contact between said gas, electrode, and ionomer membrane within said opening.
3. An apparatus for determining a total concentration of a desired component in a sample, comprising:
  - a reactor for oxidizing or reducing the sample;
  - a filter coupled to said reactor for filtering out undesirable components and for permitting the desired component to pass through; and
  - a detector coupled to said filter for detecting the component.

4. The apparatus according to claim 3, wherein said detector is an electrochemical gas sensor.
5. The apparatus according to claim 4, wherein said electrochemical gas sensor further comprises a substrate having a surface for depositing electrodes thereon; an ionomer membrane in contact with said surface of said substrate and having a first surface and a second surface; an electrode in contact with said surface of said substrate; an opening extending from said first surface to said second surface in a location proximate to said electrode for defining a passage; and a gas in said opening and simultaneously contacting said electrode and said ionomer membrane for providing a three way contact between said gas, electrode, and ionomer membrane within said opening.
6. The apparatus according to claim 3, wherein said detector is a plurality of electrochemical sensors for detecting multiple components.
7. An apparatus for determining a total concentration of various components in a sample, comprising:
  - a reactor for oxidizing or reducing the sample;
  - a first electrochemical gas sensor coupled to said reactor and having an adjustment mechanism, wherein said adjustment mechanism is selectively adjustable to detect for the presence of a selected one of a plurality of components; and
  - a second electrochemical gas sensor coupled to said reactor and having an adjustment mechanism, wherein said adjustment mechanism is selectively adjustable to detect for the presence of a selected one of a plurality of components.

8. The apparatus according to claim 7, wherein each of said first and second electrochemical gas sensors further comprises a substrate having a surface for depositing electrodes thereon; an ionomer membrane in contact with said surface of said substrate and having a first surface and a second surface; an electrode in contact with said surface of said substrate; an opening extending from said first surface to said second surface in a location proximate to said electrode for defining a passage; and a gas in said opening and simultaneously contacting said electrode and said ionomer membrane for providing a three way contact between said gas, electrode, and ionomer membrane within said opening.

9. The apparatus according to claim 7, further comprising a plurality of electrochemical gas sensors coupled to said reactor and each of said plurality of electrochemical gas sensors having a respective adjustment mechanism for detecting each of the various components.

10. The apparatus according to claim 7, further comprising a filter coupled to said reactor for filtering out undesirable components and for permitting desirable components to pass through to said first and second electrochemical gas sensors.

11. A method for determining a total concentration of a component in a sample, comprising the steps of:

- oxidizing or reducing the sample in a reactor;
- separating the component from the sample using a separation device;
- and
- coupling an electrochemical gas sensor to the separation device for detecting the component.

12. The method according to claim 11, further comprising the step of separating the component from the sample using a gas chromatograph column.
13. The method according to claim 11, further comprising the steps of providing a substrate having a surface for depositing electrodes thereon, depositing an electrode on the surface, contacting an ionomer membrane with the electrode, providing an opening in the ionomer membrane in an approximate area of the electrode, extending the opening from a first surface of the ionomer membrane to a second surface of the ionomer membrane for defining a passage, and placing a gas in the opening and simultaneously contacting the gas with both the electrode and ionomer membrane within the opening.
14. The method according to claim 11, further comprising the step of coupling a plurality of electrochemical gas sensors to the separation device for detecting multiple components.
15. The method according to claim 11, further comprising the steps of filtering out undesirable components and permitting desirable components to pass through.
16. A method for determining a total concentration of a component in a sample, comprising the steps of:
- oxidizing or reducing the sample in a reactor;
  - filtering out undesirable components and permitting a desirable component to pass through using a filter; and
  - coupling a detector to the filter for detecting the desirable component.

17. The method according to claim 16, further comprising the step of coupling an electrochemical gas sensor to the filter for detecting the desirable component.